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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,587	05/30/2001	Takehiko Nakai	35.C15390	4941
5514	7590	06/20/2005	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			AMARI, ALESSANDRO V	
			ART UNIT	PAPER NUMBER
			2872	
DATE MAILED: 06/20/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,587

Applicant(s)

NAKAI, TAKEHIKO

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 16 and 18 is/are rejected.
- 7) ☒ Claim(s) 10-15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 18 is objected to because of the following informalities:

Regarding claim 18, line 2, the term "gating" appears to be misspelled and should be spelled as "grating".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 9 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Admitted Prior Art (see also US 2002/0003661).

In regard to claim 1; the Admitted Prior Art (see Figure 8) discloses a diffractive optical element comprising a periodic first blazed type grating portion (see area corresponding to n1) and a periodic second blazed type grating portion which is arranged on a light exit side of the first blazed type grating portion (see area corresponding to n2), wherein the first blazed type grating portion and the second blazed type grating portion are each formed by a plurality of grating sections as shown in Figure 8 and a pair of grating sections corresponding to each other in each periodic first and second blazed type grating portions has the same period P_t (see P_t at bottom of Figure 8) and each of the grating sections forming at least one of the first blazed type

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grating portion and the second blazed type grating portion is formed by a sub-wavelength structured grating (5) having a period p_1 smaller than the period P_t , with the period p_1 being smaller than a wavelength of a light beam used as described in page 1, paragraphs 0008 and 0009 and in the specification, page 2, lines 20-26 and page 3, lines 1-11.

Regarding claim 2, the Admitted Prior Art discloses that wherein said diffractive optical element is structured such that within an entire region of used wavelengths, diffraction directions are made different from each other, depending upon a polarization direction of a light beam incident on said diffractive optical element, and a diffracted light is concentrated only to one predetermined diffraction order as described in page 1, paragraphs 0008, 0009 and 0011 and in the specification, page 2, lines 20-26 and page 3, lines 1-11.

Regarding claim 9, the Admitted Prior Art discloses that said used wavelength range corresponds to a light range as described in page 1, paragraphs 0008, 0009 and 0011 and in the specification, page 2, lines 20-26 and page 3, lines 1-11. While the Admitted Prior art does not specifically teach that the used wavelength range corresponds to a visible light range this is seen as an inherent teaching of the device since the optical element operates in the visible wavelength range in order to function as intended.

Regarding claim 16, the Admitted Prior Art discloses that the corresponding grating sections of the first and second blazed type grating portions have the same period as shown in Figure 8.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Shiono et al US 5,742,433.

Regarding claims 3-8 and 18, the Admitted Prior Art teaches the invention as set forth above but does not teach that in regard to claim 3 that said sub-wavelength structured grating is constituted by one kind of material, or two kinds of materials, and occupation ratios of the respective materials within one period of said periodic structure are made different from each other along a periodic direction of said grating portion or in regard to claim 4, that said diffractive optical element has a step-shaped grating portion or in regard to claim 5, that the sub-wavelength structured grating of the grating portion is varied along the periodic direction of the grating portion or in regard to claim 6 that said sub-wavelength structured grating is varied along the periodic direction of said grating portion is varied every step of the grating stepped portions or in regard to claim 7, that the sub-wavelength structured grating of the grating portion is varied in a grating thickness direction or in regard to claim 8, that the sub-wavelength structured grating varied in the grating thickness direction is varied every step of the grating stepped portion or in regard to claim 18, that the sub-wavelength structured grating is a rib like sub-wavelength structure of various depth.

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Regarding claims 3-8 and 18, Shiono et al teaches (see Figure 4) a step-shaped grating wherein the grating period, depth or thickness can be varied along a periodic direction of the grating portion as shown in Figure 4 and as described in column 6, lines 13-35.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a step shaped grating and to vary the grating period, depth or thickness as taught by Shiono et al for the grating of the Admitted Prior Art in order to improve the diffractive efficiency of the grating.

Allowable Subject Matter

6. Claims 10-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 10 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "deflecting means provided so that an emergence direction of one of a P-polarized light beam and an S-polarized light beam which has undergone polarization-separation to be diffracted in a diffraction direction different depending on a polarization direction by said diffractive optical element is made substantially coincident with an emergence direction of the other beam" as set forth in the claimed combination. Claims 13 and 14 are also allowable since they are dependent on claim 10.

Claim 11 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "a half-wave plate is provided in correspondence to

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one of a P-polarized light beam and an S-polarized light beam, which has undergone polarization-separation to be diffracted in a direction different depending upon polarization direction" as set forth in the claimed combination. Claims 13, 14 and 15 are also allowable since they are dependent on claim 11.

Claim 12 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "diffractive optical element according to claim 2 is made substantially coincident with an emergence direction of the other beam and a half-wave plate is provided in correspondence to one of the P-polarized light beam and S-polarized light beam" as set forth in the claimed combination. Claims 13, 14 and 15 are also allowable since they are dependent on claim 12.

The prior art of record, teaches a diffractive optical element comprising a subwavelength structured grating whose grating portions vary in period, depth or thickness along a periodic direction of the grating portion. However, the prior art of record does not teach its use with a polarization converting element and there is no motivation or teaching to modify this difference as derived.

Response to Arguments

8. Applicant's arguments with respect to claims 1-16 and 18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava 
16 June 2005


MARK A. ROBINSON
PRIMARY EXAMINER